

## Selective breeding boosts abalone growth and farm profitability

Abalone growth rates and profitability in Australian farms can be significantly enhanced through selective breeding programs, according to the results of South Australian Research and Development Institute (SARDI) research.

A recently completed Fisheries Research and Development Corporation (FRDC) project 'Selective breeding of farmed abalone to enhance growth rates (II)' assessed the potential for selective breeding to be used to improve production of the blacklip (*Haliotis rubra*) and greenlip (*H. laevisgata*) abalone. It was concluded that a selective breeding program is critical to enhance the industry's viability and competitiveness.

Anticipated gains modelled from a 300 tonne annual production over a 15 year period are AU\$12.7 million and benefit/cost ratio of 15.9 for a fixed farming period scenario.



Greenlip abalone, *Haliotis laevisgata*

The report's author, Dr Xiaoxu Li (SARDI's Aquaculture Subprogram Leader – Genetics, Reproduction & Biotechnology) says the project successfully strengthened the Australian abalone aquaculture industry's confidence to pursue a selective breeding program by:

- Introducing and simplifying the technical issues of selective breeding to many abalone industry representatives;
- on-farm staff training;
- demonstrating how to establish the desired breeding population size (100 families) within the required time period (one month);
- developing methodologies to establish breeding objectives for different production scenarios; and
- increasing investment interest in abalone genetic improvement programs.

During the project a total of 235 families were established between the summer of 2001/01 and 2005/06, as well as an additional 113 greenlip abalone families in less than one month in three Victorian farms during the summer of 2005/06.

The preliminary genetic analysis undertaken indicates that genetic improvement in both growth rate and marketing traits can be achieved through selective breeding.

Greater economic benefit and benefit/cost ratios can be expected when higher heritability values are applied, and/or more selected progeny are farmed.

A negative correlation between growth rate and survival was observed, which would result in a reduction in abalone survival from 80% to 70% after 5 generations (15 years) although the selection is on growth rate only. This may concern breeders because lower survival would also increase the chance of cross infection between animals in the typical onshore intensive abalone farming system used. However, this result needs to be treated cautiously as the correlation analysis was undertaken on a very small population size. If similar results are observed in future studies then strategies can be implemented to address this issue.

The methods used in the project to develop the breeding objective and the selection index used, and the sensitivity analysis undertaken to evaluate the importance of selected parameters, highlight research areas worthy of greater attention and in making decisions to obtain optimal return from investment.

Dr Li says this research represents a small but significant step forward for the industry toward the development of abalone that are faster growing, disease resistant and temperature tolerant:

"I am excited by the possibilities this research can bring to Australian abalone farms and encourage all interested parties to make the best use of it they can."

Some of the established families are being used for the farm based breeding program to ensure this valuable research continues.

If you are interested in a copy of the report contact FRDC on 02 6285 0400 or frdc@frdc.com.au.

## Key Points

Growth rates of farmed Australian abalone can be enhanced through selective breeding programs

The industry's confidence to pursue a selective breeding program has been strengthened through:

- familiarisation with the technical issues of selective breeding;
- on-farm training of staff;
- establishing the desired breeding population size (100 families) within the required time period (one month);
- developing methodologies to establish breeding objectives for different production scenarios; and
- increasing investment interest in abalone genetic improvement programs.

## Key Contact

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Australian Abalone Growers Association  
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